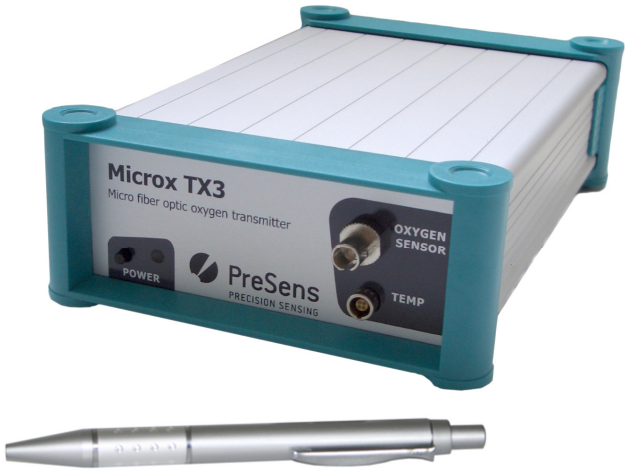
TRANSMITTERS

Microx TX3

Micro fiber optic oxygen transmitter

Instruction Manual



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Microx TX3

Specification:

Micro fiber optic oxygen transmitter for use with oxygen microsensors

Software version:

TX3v602

Document filename: IM_Microx_TX3_dv1

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1 Preface

You have chosen a new, innovative technology for measuring oxygen.

The Microx TX3 is a compact, easy to transport and completely PC-controlled micro fiber optic oxygen transmitter. The data evaluation is PC supported as well.
The Microx TX3 is developed especially for fiber optic oxygen microsensors, and microsensors integrated in flow-through cells. They are based on a novel technology, which creates very stable, internally referenced measured values. This allows a more flexible use of oxygen sensors in various fields of interest.

Optical oxygen sensors (also called optodes) have several important features:

- They are small.
- Their signal does not depend on the flow rate of the sample.
- They can be physically divided from the measuring system which allows a non-invasive measurement.
- They can be used in disposables.

Therefore, they are ideally suited for the examination of small sample volumes, for highly parallelized measurements in disposables, and for biotechnological applications. A set of different oxygen minisensors, flow-through cells and non-invasive sensors is available to make sure you have the sensor which matches your application.
Please feel free to contact our service team to find the best solution for your application.

Your PreSens Team

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE WORKING WITH THIS DEVICE.

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2 Description of the Microx TX3 Transmitter

The Microx TX3 is a precise single channel micro fiber optic oxygen transmitter with temperature compensation. It is designed for very small fiber optic oxygen microsensors (tip diameter < 50 µm) with sensor coating type PSt1 (limit of detection 0.05 % oxygen, 20 ppb dissolved oxygen). The small outer dimensions and low power consumption make it suitable for portable use. For operation, a PC / notebook is required. The Microx TX3 is controlled using a comfortable software, which also saves and visualizes the measured values.

Fig. 1 Microx TX3, micro fiber optic oxygen transmitter for use with oxygen microsensors

The Microx TX3 has a dual 12 bit analog output, and an external trigger input to be connected to a data logger.

The analog outputs are programmable to deliver oxygen, temperature or the raw values (phase or amplitude). The data are retrieved via PC / notebook and USB (alternatively RS232) (digital) or using the external trigger input (analog).

Features:

- High precision
- Portable (battery power optional)
- Analog / Digital data output (on request)
- Temperature compensation

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2.1 Scope of Delivery

Fig. 2 Case with all delivered equipment

- Microx TX3, micro fiber optic oxygen transmitter
- Software TX3v602 (CD)
- USB serial driver (CD)
- USB cable
- RS232 cable
- Power supply (100 - 240 VAC, 18 VDC)
- Temperature sensor PT 1000

Additionally required equipment (not supplied):

- Oxygen-sensitive chemical optical microsensor
  You can find microsensors – mounted into different types of housings – on www.presens.de/products
- PC / Notebook for comfortable data recording and configuration
  System requirements:
  Microsoft® Windows® XP / Vista™ or Microsoft® Windows® 7; Processor power according to minimum requirements of the respective operating system

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2.2 Front Panel

The front panel is equipped with a connector for the fiber optic microsensor, a connector for the temperature sensor, a control LED and an ON / OFF switch.

Fig. 3 Transmitter front panel

ELEMENT	DESCRIPTION	FUNCTION
POWER	ON / OFF switch	Switches the device ON and OFF.
	Control LED	red: device off green: device on orange: standby
OXYGEN SENSOR	ST fiber connector	Connect the fiber optic microsensor here.
TEMP	Connector for PT 1000 temperature sensor	Connect the PT 1000 temperature sensor for temperature compensated measurements here.

2.3 Rear Panel

Two standard BNC connectors are added for analog output channels 1 and 2, another one for external trigger input. The electrical specifications of all rear panel connectors are given in chapter 5 “Technical Data”. Please follow these notes to avoid mistakes.

Fig. 4 Transmitter rear panel

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ELEMENT	DESCRIPTION	FUNCTION
12 VDC	Line adapter for power supply	Connect the power supply cable. Use the provided parts only.
RS232	USB / RS232 interface (male)	Connect the device with a USB or RS232 data cable to your PC / notebook. Use the provided parts only.
CH 1	Analog out (channel 1)	Connect the device with external devices, e.g. a data logger.
CH 2	Analog out (channel 2)	Connect the device with external devices, e.g. a data logger.
EXT TRIG	External trigger input	Connect the device with external devices, e.g. a data logger with a trigger output, pulse generator.

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3 Installation

3.1 Set-up

Fig. 5 Set-up for Microx TX3

A typical set-up is shown in Fig. 5. An oxygen microsensor is connected via an optical fiber to the transmitter which is connected via a serial COM port to a PC.

The TX3v602 software is compatible with Microsoft® Windows® XP / Vista™ and Microsoft® Windows® 7.

Remove the rubber cap from the optical sensor connector (ST connector) and keep the cap. After measurements or for storing the transmitter the rubber cap should be put back on to keep the optical sensor connector clean.

! It is recommended to clean the ST connector with a dust free cleaning wipe or a cleaning implement for ST connectors before the measurement. Make sure to insert the cleaning implement into the inner part of the connector; then turn it three or four times.

Remove the protective cap from the male plug on the optical fiber and insert it in the ST connector of the Microx TX3. The ST plug has to be inserted and slightly turned clockwise to fasten it. Be careful not to snap off the optical fiber; best hold the fiber between forefinger and thumb at the bayonet lock of the male plug (see Fig. 6).

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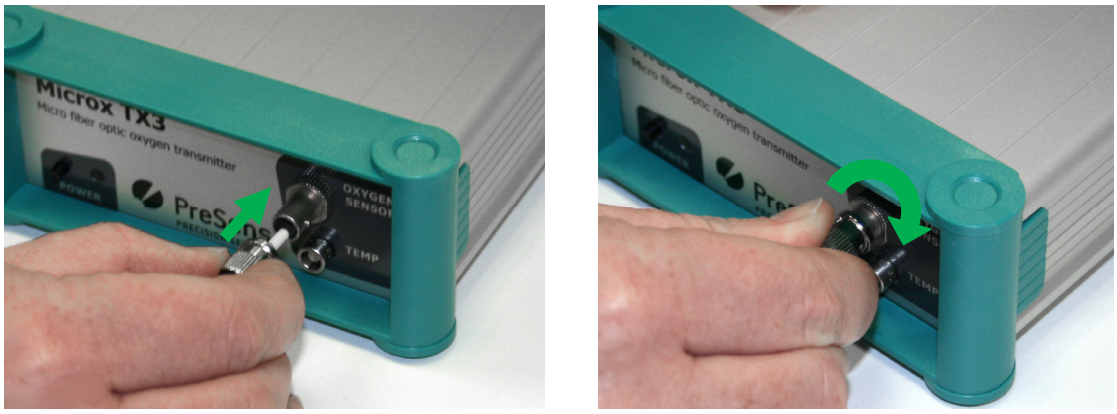

Fig. 6 Attaching the oxygen microsensor to the connector on the transmitter

There is a red mark on the temperature sensor connector of the Microx TX3. The temperature sensor plug also has a red mark. Match those two marks before inserting the temperature sensor plug into the connector on the transmitter front panel; else the plug might get damaged.

3.2 Software Installation

The software is working with English and German regional settings. Please change your setting to one of these settings before installing the software.

1. Please close all other applications as they may interfere with the software.
2. Insert the supplied CD-ROM into the respective drive.
3. If no dialog opens automatically, use the explorer to open the file menu on the CD. Copy the file “TX3v602.exe” to a folder on your PC (e.g. C:/PreSens/…) and create a shortcut to your desktop so you are able to start the software quickly.
4. Start the software by double clicking the symbol for the “TX3v602.exe” file.

3.3 USB Serial Driver Installation

The USB-RS232-RJ 4/4 requires

- At least one available USB port
- Windows XP / Vista / Windows 7

Connect the USB cable to the PC / notebook and insert the delivered driver CD.

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The **Found New Hardware Wizard** will launch automatically. Select **No, not this time** from the options and click **Next**.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Online privacy information
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Fig. 7 Found New Hardware Wizard

Select **Install from a list or specific location (Advanced)**; then click **Next**.

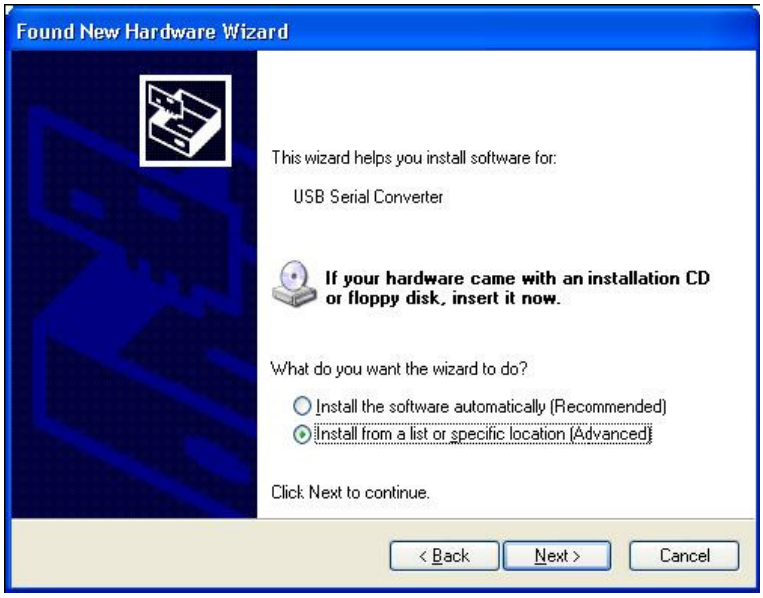
Found New Hardware Wizard
This wizard helps you install software for:
USB Serial Converter
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Fig. 8 Found New Hardware Wizard

Select **Search for the best driver in these locations** and go to **Search for removable media (floppy, CD-ROM…)**. Click **Next** to proceed.

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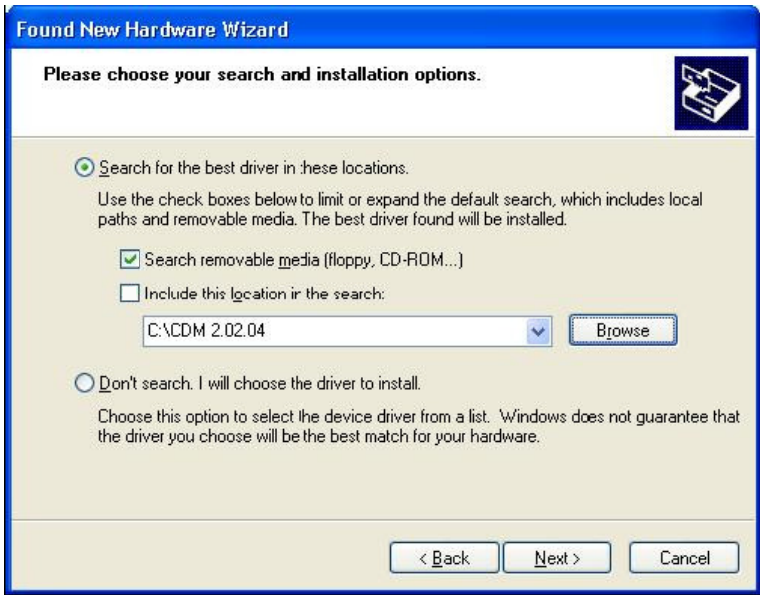
Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in :hese locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location ir the search:
C:\CDM 2.02.04
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Fig. 9 Found New Hardware Wizard

Then Windows will copy the required driver files. Windows should then display a message indicating that the installation was successful. Click **Finish** to complete the installation.

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4 Operation

4.1 Adjustment of Regional Settings of the Operating System

The software is working with English and German regional settings.
To change the regional settings on your PC press **Start** and go to the **Control Panel**. Choose **Regional and Language Options**.

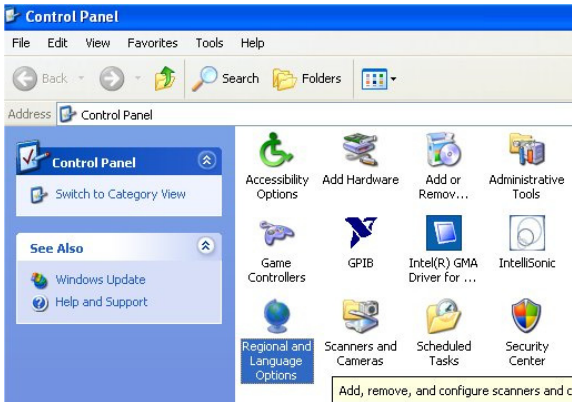

Fig. 10 Control Panel – Classic View

Select the **Regional Options** tab (e.g. English (United States)) and click **Customize**.

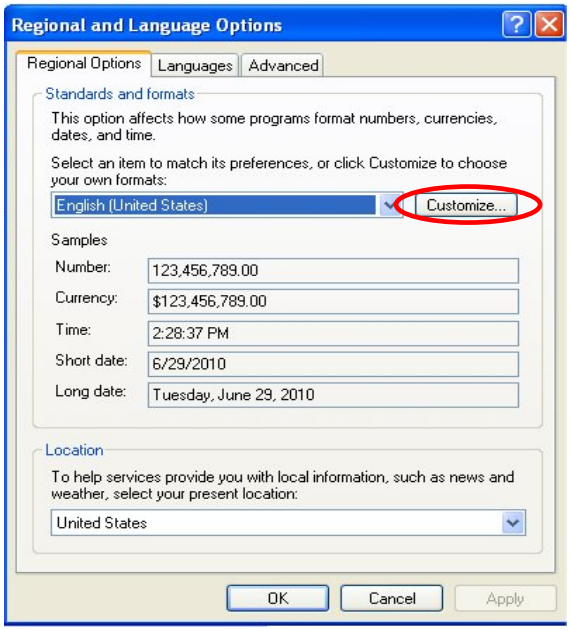

Fig. 11 Regional and Language Options window

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A window opens; select the **Numbers** tab and choose the dot `.´ in the **Decimal Symbol** drop down menu. In the drop down menu **Digit grouping symbol** you have to choose space ` ´. Then press **Apply** and **OK**.

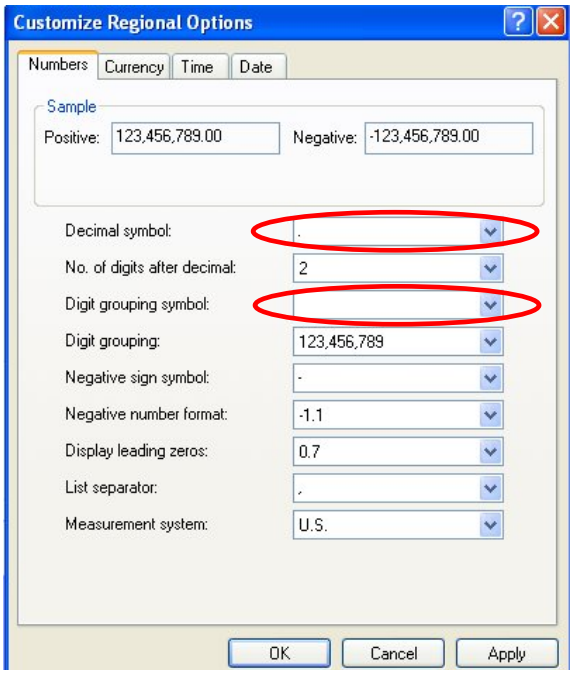

Fig. 12 Customize Regional Options window – Numbers tab

Click **Customize** again and go to the **Date** tab now. In the drop down menu **Short date format** you have to select `**dd.MM.yy**´ and choose the dot `.´ in **Date separator**. Again press **Apply** and **OK**.

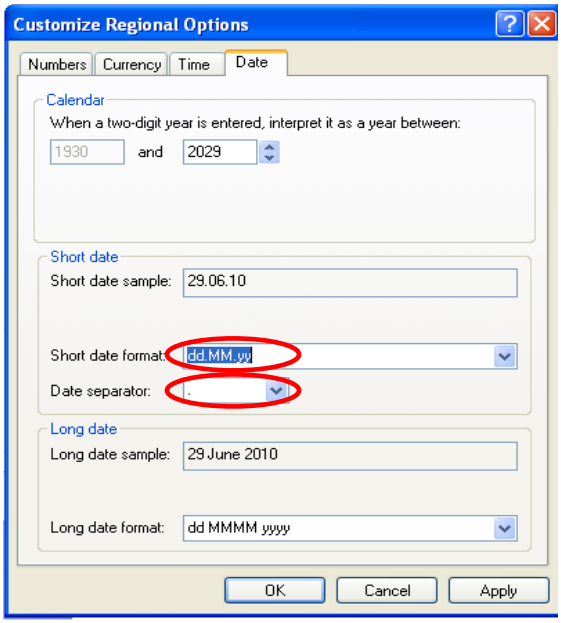

Fig. 13 Customize Regional Options window – Date tab

Press **OK** in the **Regional and Language Options** window, and you have finished adjusting the regional settings.

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4.2 Configuration of COM Port

To check which COM port is assigned to the USB cable press **Start** and go to the **Control Panel**. Select **System**.

Select the **Hardware** tab in the **System Properties** window and click **Device Manager**.

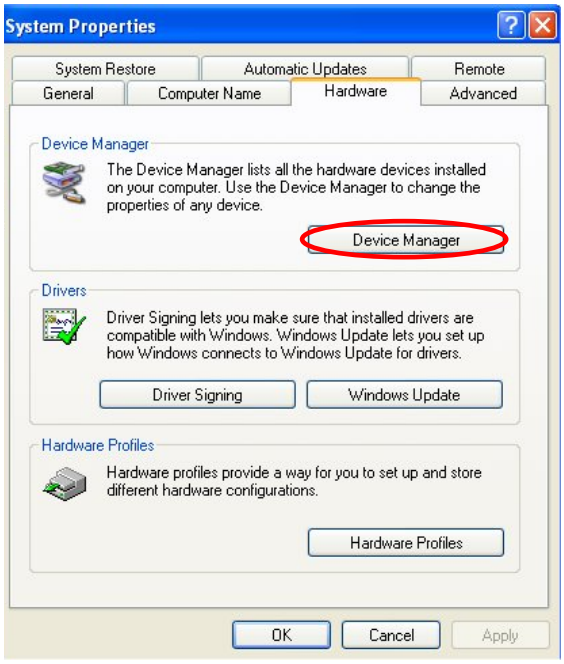
System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

Fig. 14 System Properties window

You can find the USB serial Port under **Ports (COM & LPT)** (in the figure below this would be COM port 6 for example).

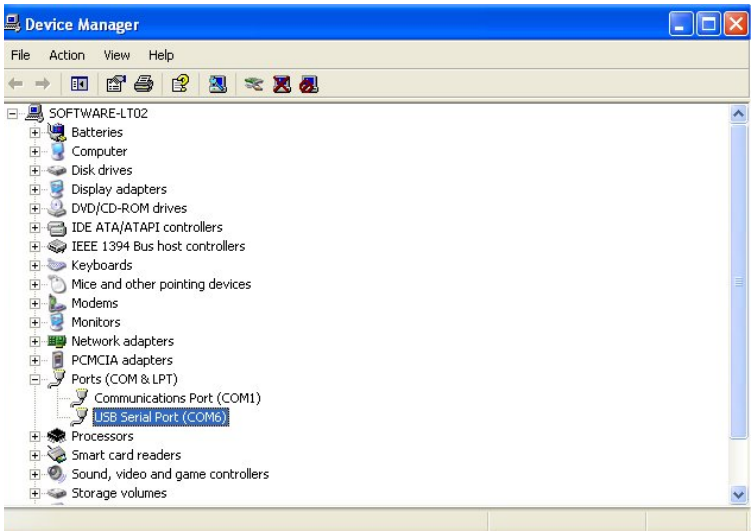

Fig. 15 Device Manager – USB Serial Port selected

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! Microx TX3 only accepts COM port numbers that are < 10. In case the COM port number is 10 or higher please change it to a port number < 10.

To change the COM port number you open the **Device Manager** activate **Port (COM & LPT)** and double-click the USB-Serial Port. A window opens; select the **Port Settings** tab and click on **Advanced**.

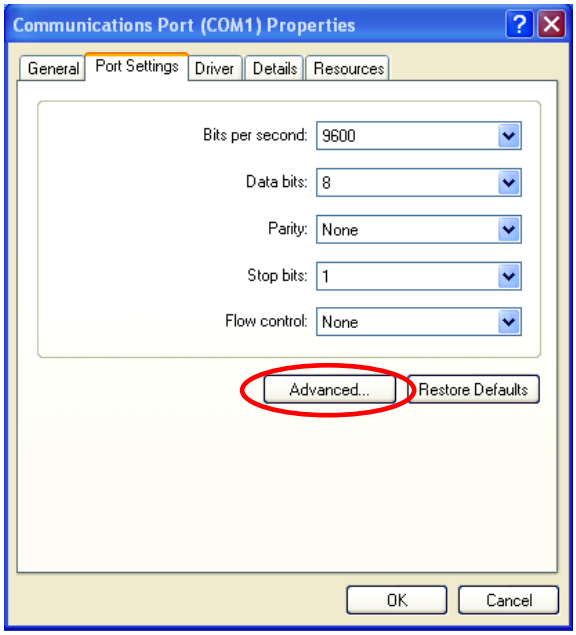

Fig. 16 USB Serial Port Properties – Port Settings tab

Change the **COM Port Number** to a free port number < 10 and click **OK**.

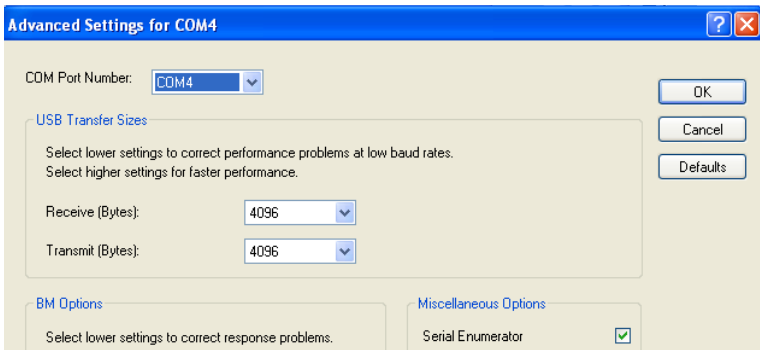

Fig. 17 Advanced Settings for COM Port window

You have to confirm the new port number by clicking **OK**; then you can close the device manager.

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4.3 Starting the Device

1. Connect the Microx TX3 via the supplied USB cable to a serial COM port of your PC / notebook. (Alternatively, you can connect the Microx TX 3 via the RS232 cable to a serial COM port of your PC / notebook. Tighten the cable with the screws on your PC / notebook.)
2. Connect the power supply.
3. Please close all other applications as they may interfere with the software. Start the software TX3v602.

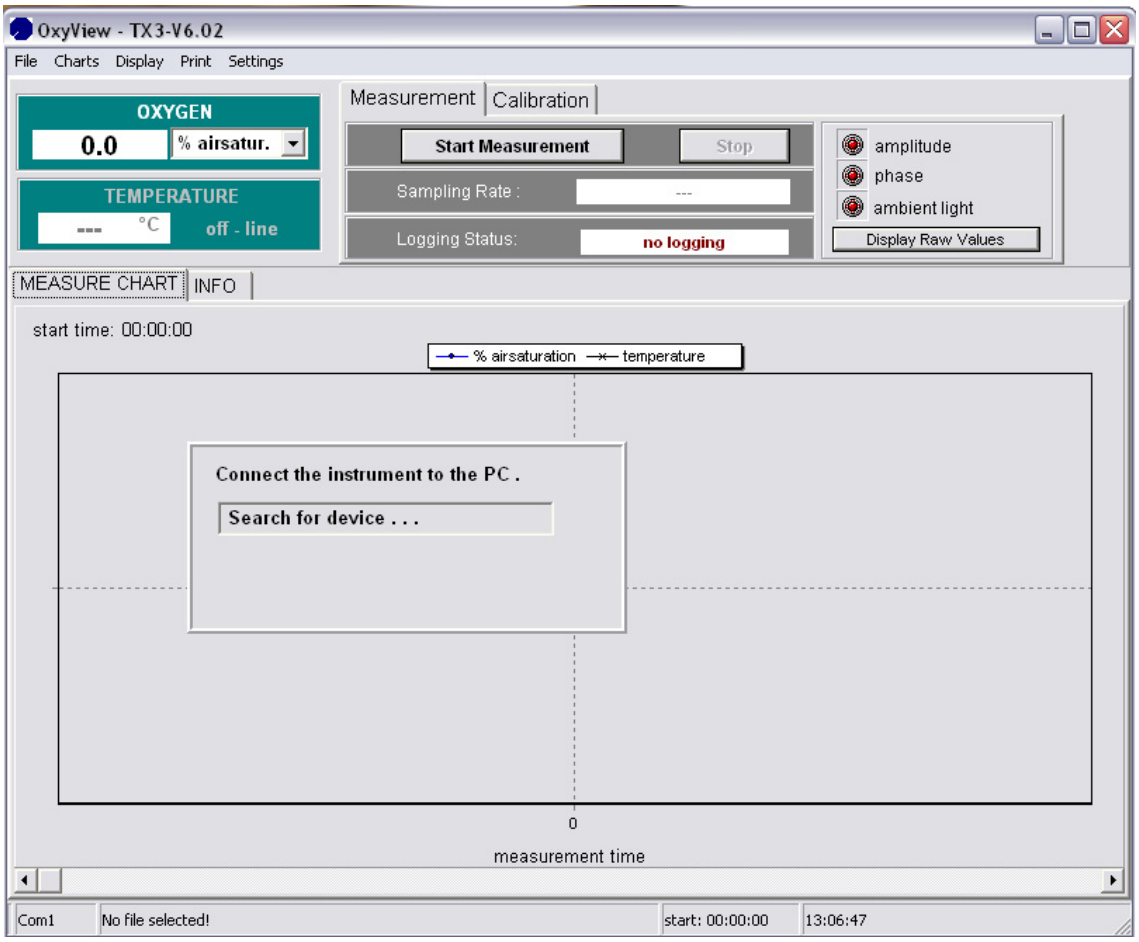

Fig. 18 Initial Window - Software is scanning to detect the connected Microx TX3 device

The software is scanning all COM ports available to detect and configure the connected Microx TX3 device.

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If the software is unable to detect the correct COM port, a message is displayed asking you to choose the right COM port.

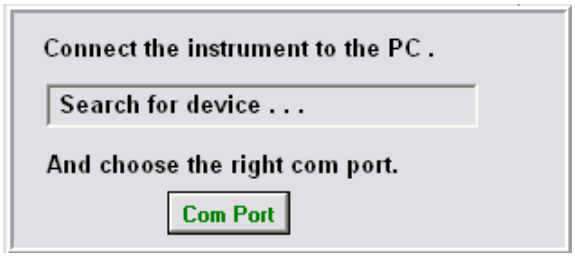

Fig. 19 Information dialog – choose the right COM port

With a right mouse click onto **Com Port** the dialog **Select COM Port** opens. Select the correct COM port in the drop-down menu and click the **OK** button.

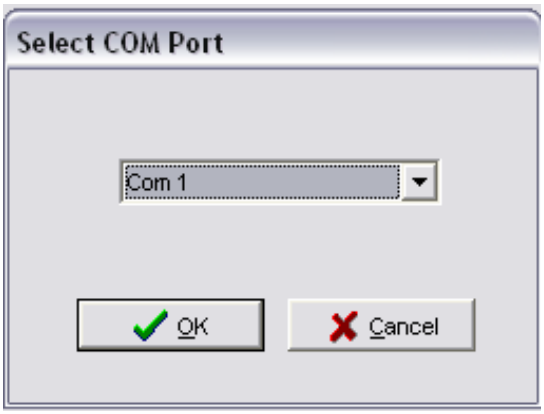

Fig. 20 Select COM Port dialog

! If no device is detected, please check all connections and proper installation of serial COM ports.

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The window shown below is displayed after the connected transmitter got detected:

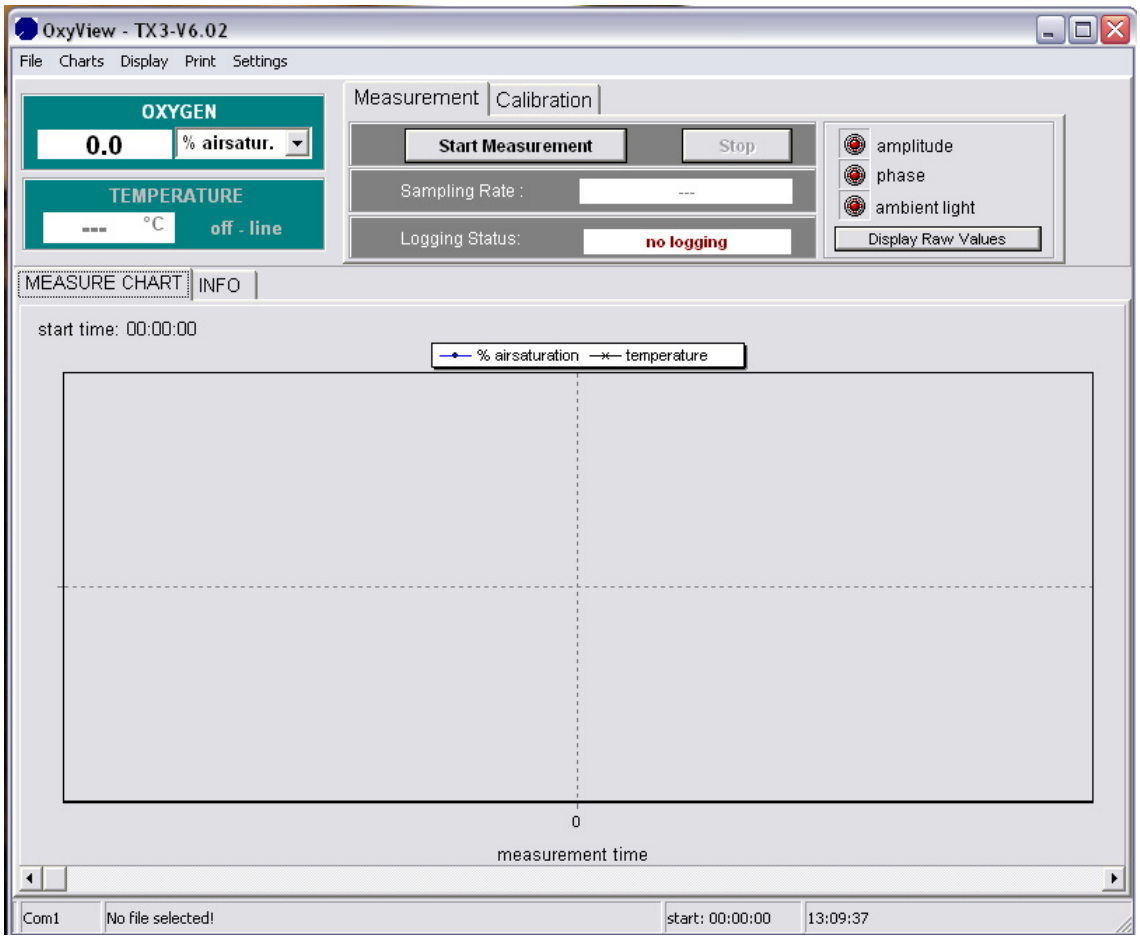

Fig. 21 Initial display of TX3v602

Now connect the oxygen microsensor and temperature sensor to the respective connectors on the transmitter front panel.

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4.4 Calibration

Prior to measurements you have to calibrate the oxygen microsensor. Click the **Calibration** tab in the upper middle screen.

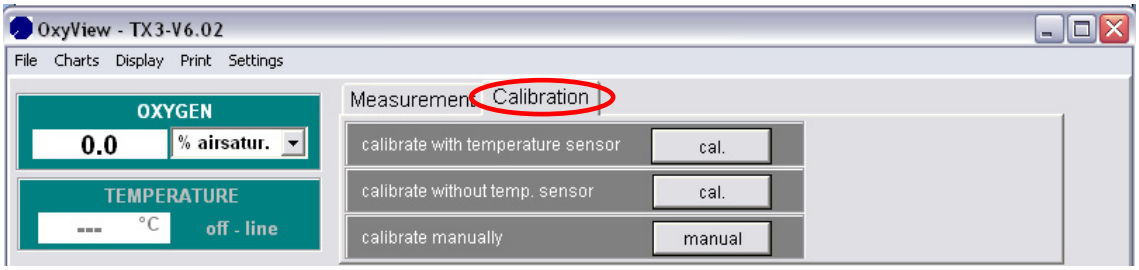

Fig. 22 Calibration tab

There are three different calibration modes:

- With the setting **calibrate with temperature sensor** the current raw phase values of the oxygen microsensor are measured and stored. Temperature during calibration is measured with the PT 1000 temperature sensor and saved. The temperature sensor has to be in close vicinity to the oxygen microsensor or make sure that the temperature at both oxygen and temperature sensor is the same.
- With the setting **calibrate without temp. sensor** the current raw phase values of the oxygen microsensor are measured and stored. The temperature value during calibration is set manually in the software and stored. This option can be used, if the temperature at the location of the oxygen microsensor is known.
- With the setting **calibrate manually** the raw phase values of the oxygen microsensor as well as the temperature values are set manually in the software. This option can be used, if previously measured calibration values for the currently used oxygen microsensor are available. You can find calibration data on the Final Inspection Protocol delivered with your oxygen microsensor (see Fig. 32).

Please read the instruction manual of the respective oxygen sensor for more detailed information about calibration standards and sensor specifications.

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4.4.1 Calibration with Temperature Sensor

Clicking the **cal.** button next to **calibrate with temperature sensor** opens the respective **Calibration Menu** dialog:

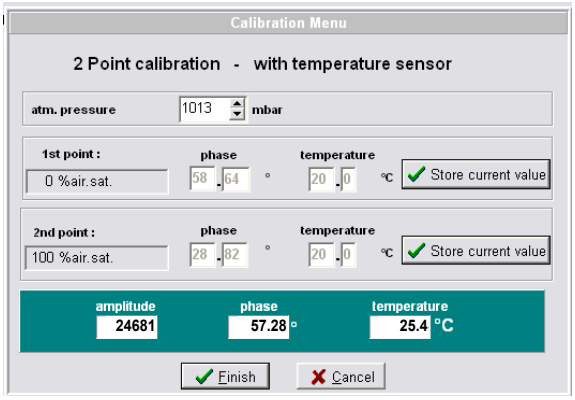

Fig. 23 Dialog for calibration with temperature sensor

1. Insert the current atmospheric pressure value.
2. Set the first calibration point (0 % air sat.).
   Place the oxygen microsensor and temperature sensor in the medium for the first calibration point. At the bottom of the dialog the currently measured amplitude and phase value of the oxygen microsensor and the temperature are displayed. Watch the displayed phase value; wait for about 3 minutes until the phase angle is constant (the variation of the phase angle should be smaller than ± 0.1° and the variation of temperature smaller than ± 0.1°C) and click the **Store current value** button to the right of the **1st point** value. The transmitter stores amplitude, phase and temperature values.

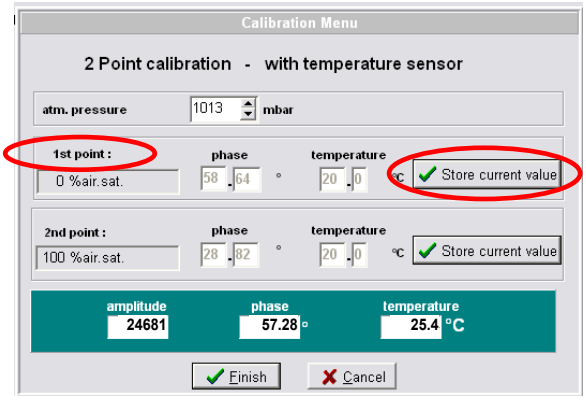

Fig. 24 Dialog for calibration with temperature sensor – storing the first calibration value

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A warning message is displayed saying this will overwrite the existing calibration values; hit **Continue** and the 1st point values will be updated.

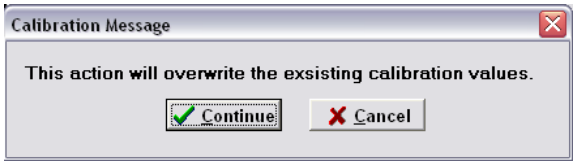

Fig. 25 Calibration message window

3. Set the second calibration point (100 % air sat.).
   Place the oxygen microsensor and temperature sensor in the medium for the second calibration point. At the bottom of the dialog the currently measured amplitude and phase value of the oxygen microsensor and the temperature are displayed. Watch the displayed phase value; wait for about 3 minutes until the phase angle is constant (the variation of the phase angle should be smaller than ± 0.1° and the variation of temperature smaller than ± 0.1°C) and click the **Store current value** button to the right of the **2nd point** value. The transmitter stores amplitude, phase and temperature values.

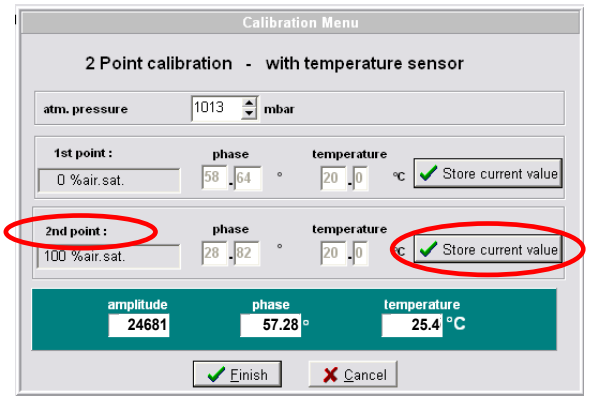

Fig. 26 Dialog for calibration with temperature sensor – storing the second calibration value

A warning message is displayed saying this will overwrite the existing calibration values (see Fig. 25); hit **Continue** and the 2nd point values will be updated.

End the calibration process by clicking the **Finish** button. The calibration data are stored to the transmitter and the display in the **INFO** tab will be updated.

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4.4.2 Calibration without Temperature Sensor

Clicking the **cal.** button next to **calibrate without temperature** sensor opens the respective Calibration Menu dialog:

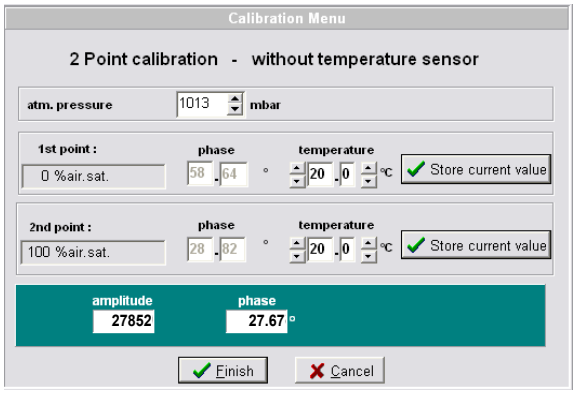

Fig. 27 Dialog for calibration without temperature sensor

1. Insert the current atmospheric pressure value.
2. Set the first calibration point (0 % air sat.).
   Place the oxygen microsensor in the medium for the first calibration point. At the bottom of the dialog the currently measured amplitude and phase value of the oxygen microsensor are displayed. Set the current temperature at the oxygen microsensor by using the up and down arrows or typing in the temperature value. Watch the displayed phase value; wait for about 3 minutes until the phase angle is constant (the variation of the phase angle should be smaller than ± 0.1°) and click the **Store current value** button to the right of the **1st point** value. The transmitter stores amplitude, phase and temperature values.

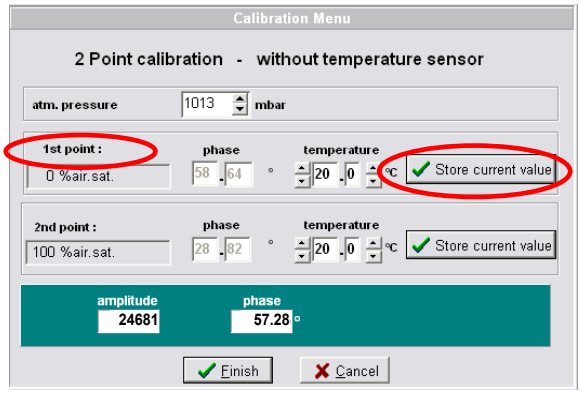

Fig. 28 Dialog for calibration without temperature sensor – storing the first calibration value

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A warning message is displayed saying this will overwrite the existing calibration values; hit **Continue** and the 1st point values will be updated.

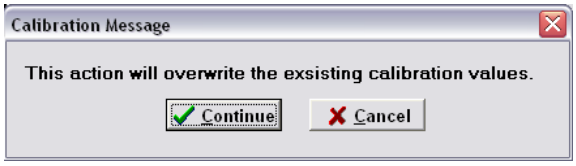

Fig. 29 Calibration message window

3. Set the second calibration point (100 % air sat.).
   Place the oxygen microsensor in the medium for the second calibration point. At the bottom of the dialog the currently measured amplitude and phase value of the oxygen microsensor are displayed. Set the current temperature at the oxygen microsensor by using the up and down arrows or typing in the temperature value. Watch the displayed phase value; wait for about 3 minutes until the phase angle is constant (the variation of the phase angle should be smaller than ± 0.1°) and click the **Store current value** button to the right of the **2nd point** value. The transmitter stores amplitude, phase and temperature values.

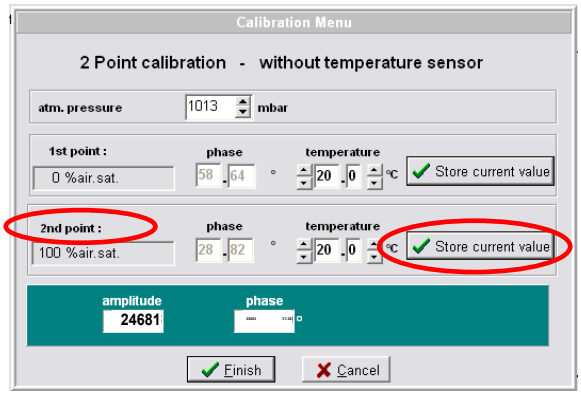

Fig. 30 Dialog for calibration without temperature sensor – storing the second calibration value

A warning message is displayed saying this will overwrite the existing calibration values (see Fig. 29); hit **Continue** and the 2nd point values will be updated.

End the calibration process by clicking the **Finish** button. The calibration data are stored to the transmitter and the display in the **INFO** tab will be updated.

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4.4.3 Manual Calibration

Clicking on **manual** will open the respective **Calibration Menu** dialog:

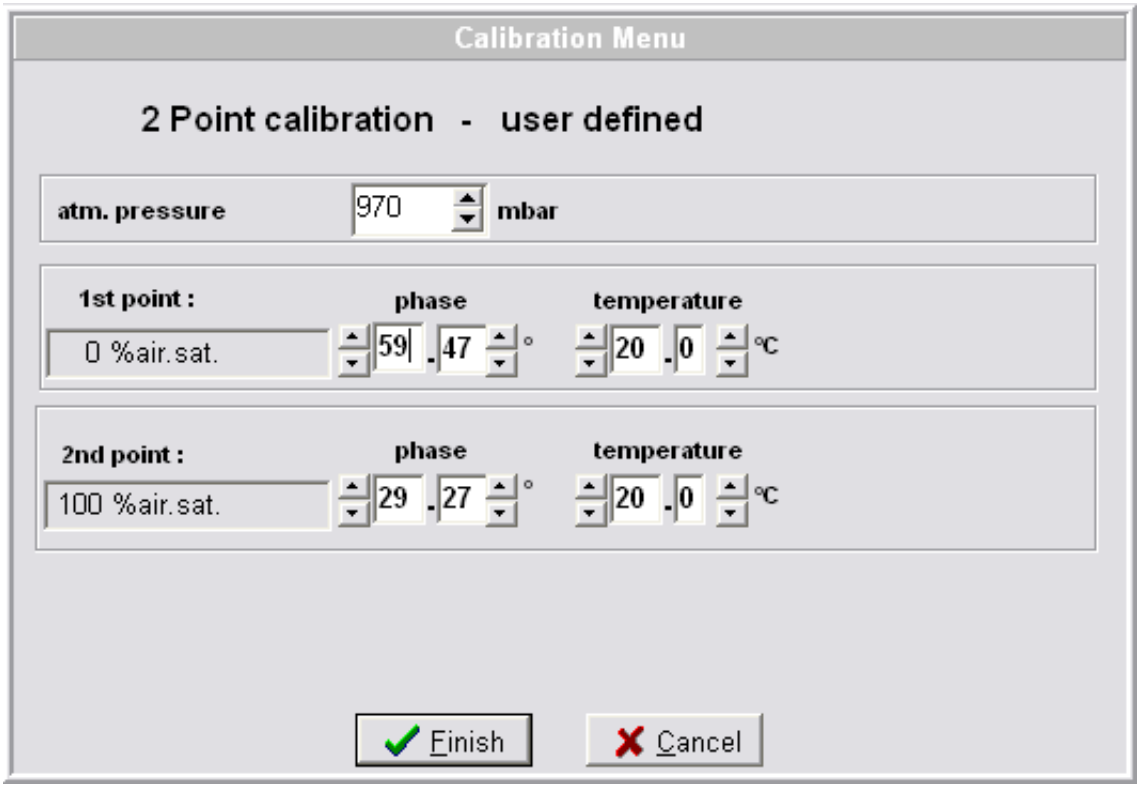

Fig. 31 Dialog for user defined calibration

1. Insert the current atmospheric pressure value.
2. Select phase and temperature value for the first calibration point.
3. Select phase and temperature value for the second calibration point.

You can find calibration data on the Final Inspection Protocol delivered with your oxygen microsensor (see Fig. 32). Use the values in the grey highlighted boxes to fill in the **Calibration Menu**.

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Data

Atmospheric pressure: **970** hPa

	Phase signal	Valid range	Temperature	Valid range	Amplitude
	[°]	[°]	[C°]	[C°]	[r.U.]
cal 0 **0% air sat**	**59.47**	58.00 - 61.00	**20.0**	18.0 - 22.0	46450
cal 2nd **100 % air sat**	**29.27**	27.00 - 30.00	**20.0**	18.0 - 22.0	22710

Response time [t90]: < 60 s **Valid range:** < 60 s

Please type in these values into the software for "manual calibration"

Fig. 32 Example for a Final Inspection Protocol

End the calibration process by clicking the **Finish** button. A warning message is displayed saying this will overwrite the existing calibration values. Hit **Continue**. The calibration data is stored to the transmitter and the display in the **INFO** tab will be updated. Abort the calibration by clicking the **CANCEL** button.

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4.5 Measurement

Press the **Start Measurement** button to open the **Measurement Assistant**.

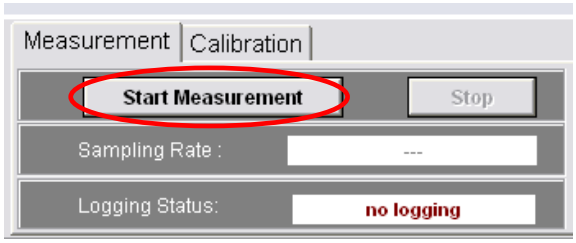

Fig. 33 Start measurement button

If no calibration has been performed or the software has been closed after calibration the following message showing the date of the last calibration is displayed:

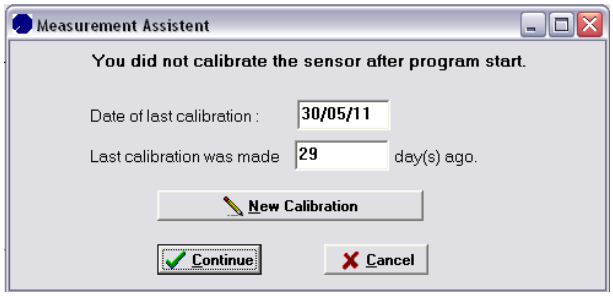

Fig. 34 Measurement Assistant dialog showing the date of the last calibration

Click **Continue** to go on with the measurement assistant or press **New Calibration**, which will get you back to the calibration menu.

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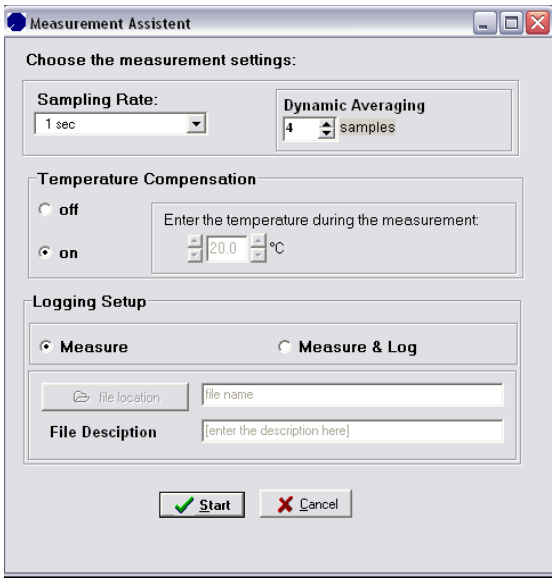

Fig. 35 Measurement Assistant dialog

Sampling Rate

Measurement frequencies from “fast sampling” up to 60 minutes can be selected. The speed in “fast sampling” mode is about 250 ms when no temperature sensor is connected and decreases to about 350 ms when connecting the temperature sensor or activating the analog output channels.

! The sensor shelf-life can be increased using a slower measuring mode; the effect of photobleaching is reduced as the illumination light is switched off between sampling. Moreover a huge amount of data for long-time measurements can be avoided using a slower measuring mode.

Dynamic Averaging

When choosing a sampling rate of 1 sec. **Dynamic Averaging** can be selected. This defines the number of averaged measured values. The higher the running average, the longer the time (sampling time) used for averaging. With a higher running average value set (maximum 25 samples) a smoother measurement signal can be achieved. The default setting is 4.

Temperature Compensation

Select the temperature measurement mode for temperature compensated oxygen measurement. The following options can be selected:

- Selecting **off** you have to set a constant temperature value. This option can be used, if the temperature at the location of the oxygen microsensor is known and stays constant throughout the measurement.
- Selecting **on** the temperature value for temperature compensation of the oxygen microsensor is measured with the supplied PT1000 temperature sensor. Make sure the temperature sensor is connected to the transmitter properly.

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Logging Setup

Measurements can be done with or without data logging.

! Subsequent data storage is not possible, if you do your measurements without data logging.

If you select **Measure & Log**, click the **file location** button to choose a location for the measurement file and name it. In the **File Description** area you can add a small note to the measurement file which is going to be saved with the file header. The measurement file is saved as txt-file in ASCII format.

When all pre-settings are done start the measurement by clicking the **Start** button. The **Calibration** and **Data Logging** tab are hidden now and the selected **Sampling Rate** and **Logging Status** are displayed in the **Measurement** tab.

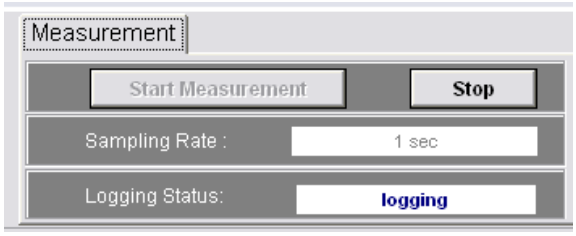

Fig. 36 Measurement tab showing sampling rate and logging status

Press the **Stop** button to end the measurement. This will also stop the data logging process.

To close the software select **File** / **Exit**.

4.5.1 Control Bar

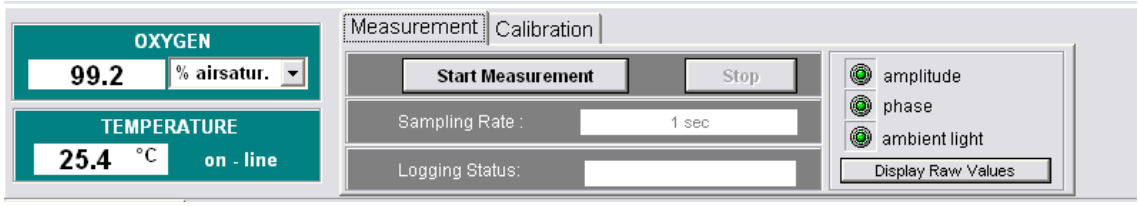

Fig. 37 Software display – Control Bar

The control bar contains a numerical display for oxygen and temperature as well as warning lights. The control buttons for **Calibration**, and **Measurement** are described in chapters 4.4, and 4.5.

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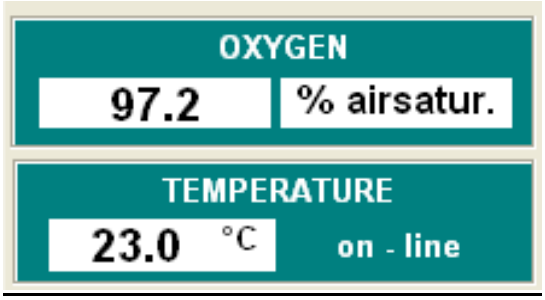

Fig. 38 Numerical Display

The temperature for temperature compensated measurement is displayed either “on-line”, if the temperature sensor is connected, or “off-line”, if the temperature sensor is not connected.

In the upper right corner warning lights are displayed showing possible errors of the raw data (amplitude, phase, ambient light).

- amplitude: green: The amplitude is correct.
  yellow: The amplitude is critically low; replacement of the sensor is recommended.
  red: The amplitude is too low; the sensor tip may be damaged or the sensor cable may not be connected.
- phase: green: The phase angle is within the normal range.
  red: The phase angle is out of limits.
- ambient light: green: The ratio of sensor signal to ambient light is acceptable.
  red: The level of background light (e. g. direct sunlight, lamps) is too high. Reduction of ambient light is recommended.

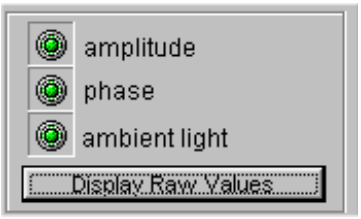

Fig. 39 Control Bar – warning lights

Clicking on **Hide Raw Values** / **Display Raw Values** will hide or show the raw data values for **amplitude** and **phase**.

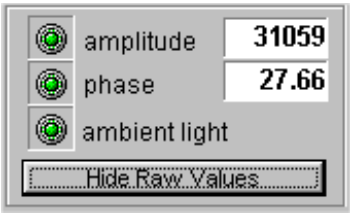

Fig. 40 Control Bar – warning lights, the raw values are displayed

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4.5.2 Graphical Display

Fig. 41 Software display – Graphical display

Different graphs (oxygen, phase, amplitude and temperature) can be displayed by activating them in the **Charts** menu. The respective graph will be shown in the graphical display.

Zooming is possible by a left mouse click and movement from the upper left corner to the lower right corner of the area of interest. Zooming out is done vice versa or by using the submenu **Display** / **Zoom** / **Undo Zoom**.

Choosing **Display** / **AutoScaleY** the y-axis is scaled automatically. It is activated by default setting.

Selecting the submenu **Display** / **Dimensions** opens the dialog for **Dimension Settings**.

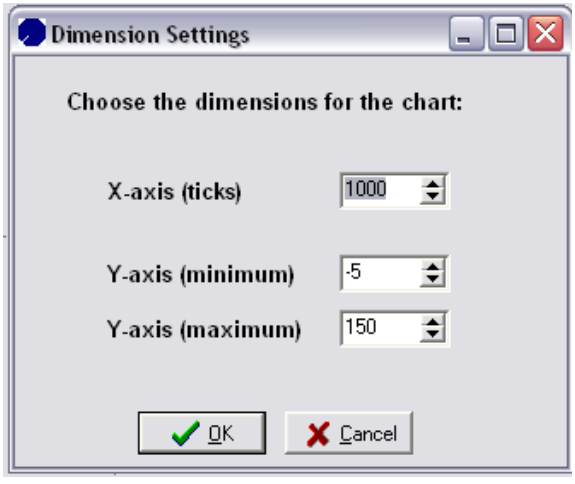

Fig. 42 Dimension Settings dialog

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You can adjust the number of measurement points on the x-axis shown in the display (maximum number of points is 5000). Furthermore, you can adjust the minimum and maximum of the y-axis. Making adjustments will turn off the **AutoScaleY** function.

Use the submenu **Display** / **Clear Charts** to clear the graphs on the display.

Selecting **Print** / **Charts** will print all the graphs shown on the display.

Opening the **INFO** tab will show information about the software version and some important transmitter settings. You can also use the submenu **Settings** / **Instrument Info** to get to this display.

! If you have any questions concerning your Microx TX3 oxygen transmitter, please contact our service team and have the software and transmitter information ready.

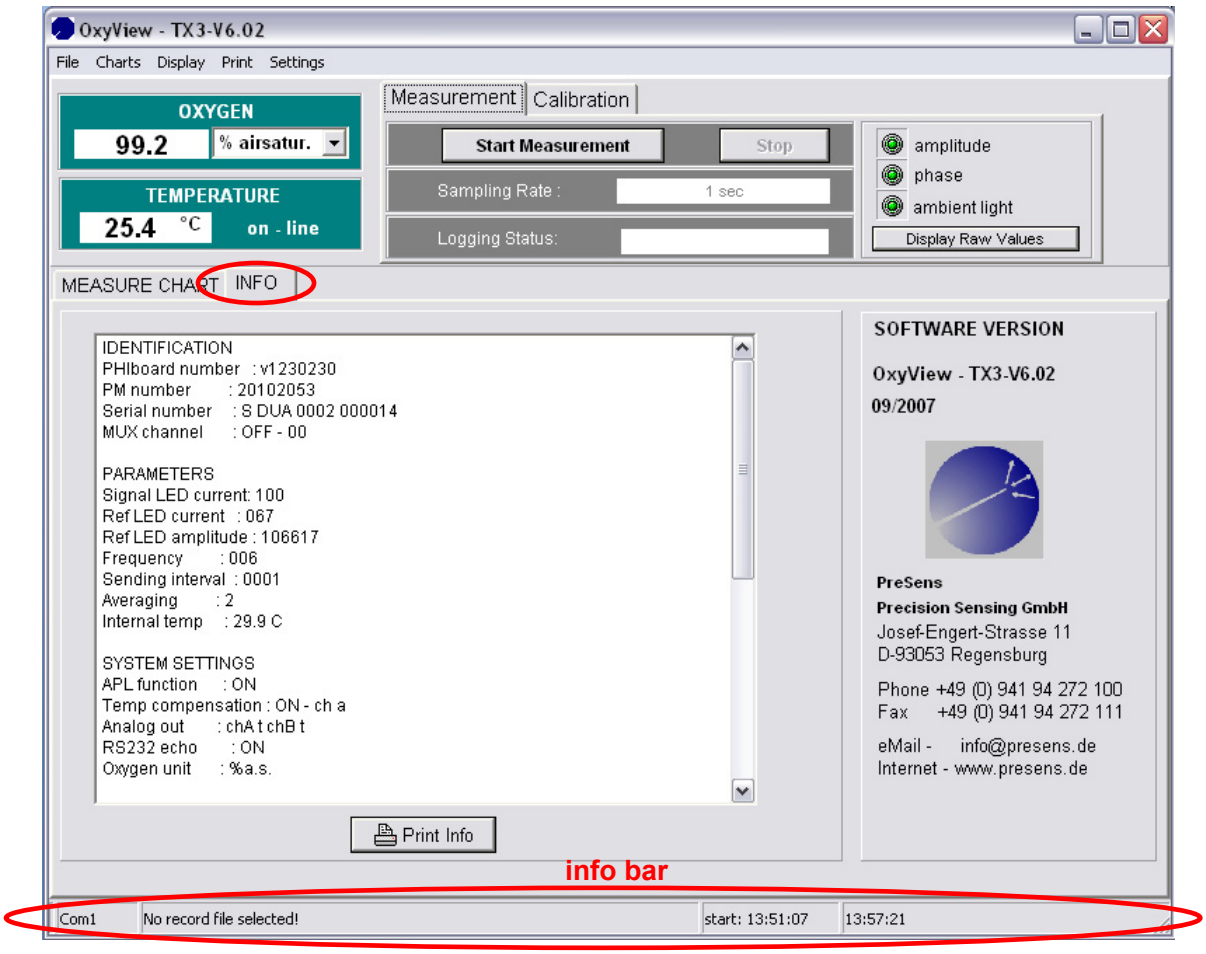

Fig. 43 INFO tab display and info bar

The info bar located at the bottom of the screen provides information about the connected serial COM port, start time of the running measurement, current time and information about file name and location. If you did not select a location or file name, the message “No file selected!” is displayed in this area.

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4.6 Subsequent Data Handling

Open Excel on your PC. Go to **File** / **Open** and choose **Files of type** / **Text files**.

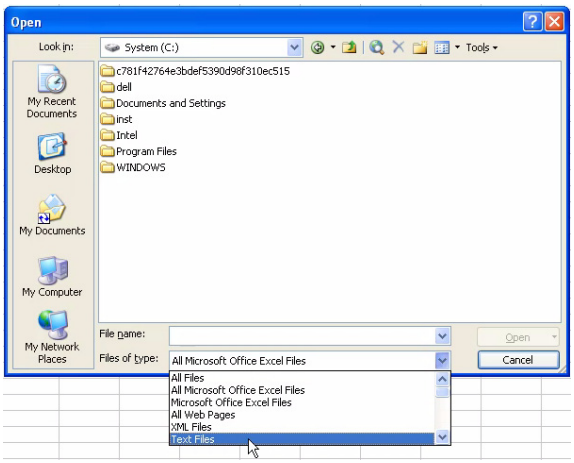

Fig. 44 Selecting file type

Choose the measurement file you want to process. The **Text Import Wizard** opens; choose **Delimited** and click **Next**.

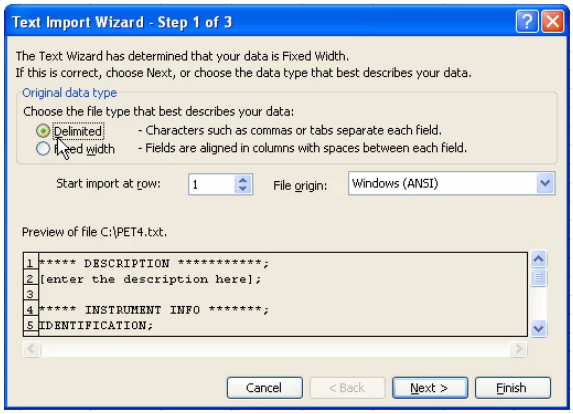
Text Import Wizard - Step 1 of 3
The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.
Original data type
Choose the file type that best describes your data:
Delimited - Characters such as commas or tabs separate each field.
Fixed width - Fields are aligned in columns with spaces between each field.
Start import at row: 1
File origin: Windows (ANSI)
Preview of file C:\PET4.txt.
1 ***** DESCRIPTION **********;
2 [enter the description here];
3
4 ***** INSTRUMENT INFO *******;
5 IDENTIFICATION;
Cancel
< Back
Next >
Finish

Fig. 45 Text Import Wizard - Step 1

Then choose **semicolon**, click **Next**, and then **Finish**.

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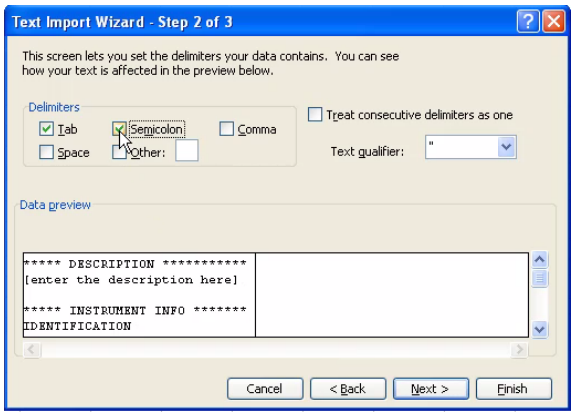

Fig. 46 Text Import Wizard - Step 2

Your measurement data are displayed and can be processed now.

In the head of the ASCII file (see Fig. 47), you find the **Description** of your measurement which you have entered when storing the file.
Below, you find the **Instrument Info** containing the data of the complete calibration routine and some more important settings of the instrument and firmware.
The **Software Info** below contains the version number of the Microx TX3 software, date and time of the performed measurement.
Below, you find the **Measure Mode Settings** containing the *dynamic averaging*, and the *measuring mode*.

The following rows, separated by semicolons, list the measuring data. The first two rows contain the **date** and **time**, the third the **log-time** in minutes, the fourth the **oxygen content** in the chosen unit. The raw data - **phase angle** in [°] and the **amplitude** in [r.U.] - are stored in the fifth and sixth row, respectively. The seventh row contains the **temperature** in °C measured by PT1000 temperature sensor.

The last row shows an **Error Message** for any error that might occur during measurement. E### is the byte error code:

- Bit 0 ADC overflow
- Bit 1 DC light overflow
- Bit 2 Amplitude too low
- Bit 3 No temperature sensor detected
- Bit 4 Overheat
- Bit 5 No oxygen calculation
- Bit 6 Reserved
- Bit 7 Reserved

Examples:

E0 = No error
E1 = Error : DC light overflow to much ambient light
E12 = Error : no temp sensor & amplitude too low

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***** DESCRIPTION **********
test measurement

***** INSTRUMENT INFO *******

IDENTIFICATION
PHIboard number : v1230230
PM number : 20102053
Serial number : S DUA 0002 000014
MUX channel : OFF - 00

PARAMETERS
Signal LED current: 100
Ref LED current : 067
Ref LED amplitude : 107021
Frequency : 006
Sending interval : 0001
Averaging : 7
Internal temp : 32.4 C

SYSTEM SETTINGS
APL function : ON
Temp compensation : ON - ch a
Analog out : chA t chB t
RS232 echo : ON
Oxygen unit : %a.s.

CALIBRATION
Sensor type : 1
0%a.s.phase 1 : 58.64 at 020.0°C amp
079300
100.00%a.s.phase 2: 28.82 at 020.0°C amp 033200
Date (ddmmyy) : 300511
Pressure (mBar) : 1013

FIRMWARE
Code 3.016 (IAP) : 08/20/04, 09:50:56
Xilinx built : 01/05/04 (MM/DD/YY)
Reset condition : SLEEP

***** SOFTWARE INFO *********
OxyView - TX3-V6.02 09/2007
© by PreSens GmbH
28.06.2011
14:17:59
******MEASURE MODE SETTINGS**
Dynamic
Averaging 4
measure mode 1 sec
start time 14:17:59

date(DD/MM/YY)	time/hh:mm:ss	logtime/min	oxygen/% airsatur.	phase/°	amp	temp/°C	ErrorMessage
28.06.2011	14:17:59	0.000	98.479	27.99	4920	25.50	E0
28.06.2011	14:18:00	0.017	98.792	27.95	4902	25.50	E0
28.06.2011	14:18:01	0.034	98.948	27.94	4889	25.50	E0
28.06.2011	14:18:02	0.051	99.240	27.91	4896	25.50	E0
28.06.2011	14:18:03	0.068	99.353	27.89	4889	25.50	E0
28.06.2011	14:18:04	0.085	98.993	27.93	4889	25.50	E0
28.06.2011	14:18:05	0.102	98.814	27.95	4889	25.50	E0
28.06.2011	14:18:06	0.118	98.792	27.96	4883	25.50	E0
28.06.2011	14:18:07	0.135	98.633	27.96	4883	25.60	E0
28.06.2011	14:18:08	0.152	98.790	27.94	4895	25.60	E0
28.06.2011	14:18:09	0.169	99.240	27.91	4883	25.50	E0
28.06.2011	14:18:10	0.186	98.924	27.92	4883	25.60	E0

Fig. 47 Example for a text file recorded with TX3v602 software

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4.7 Analog Output

Selecting the submenu **Settings / Analog Output** opens the dialog for selecting which data should be exported. There are two analog output channels available.
You can choose one of the following parameters:

- None
- Oxygen
- Phase
- Amplitude
- Temperature

! If you have adjusted the desired settings of the analog outputs and want to connect the transmitter to a data logger, please close the software to store the settings before you disconnect the Microx TX3 from the computer.

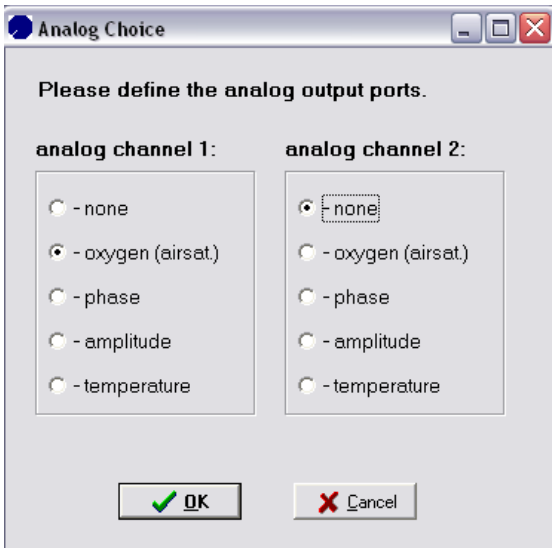

Fig. 48 Analog Choice dialog

For more detailed information about analog output specifications please refer to chapter 5.2 “Analog Output and External Trigger”.

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4.8 LED Intensity

This function is for more experienced users to change the illumination level of the device. With a higher illumination level the signal-to-noise ratio can be improved, with a lower illumination level sensor bleaching can be avoided and its measurement stability prolonged.

After changing LED-intensity the measurement parameters of the transmitter will change and the sensor has to be recalibrated. A warning message is displayed.

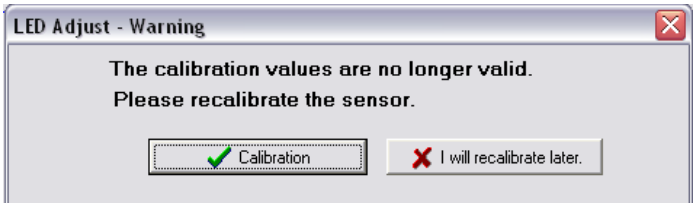
LED Adjust - Warning
The calibration values are no longer valid.
Please recalibrate the sensor.
Calibration
I will recalibrate later.

Fig. 49 LED Adjust - Warning message

There are two options: In **Auto Adjust** mode the transmitter will adjust the illumination level automatically. Manual adjustment is possible in the **Advanced** mode.

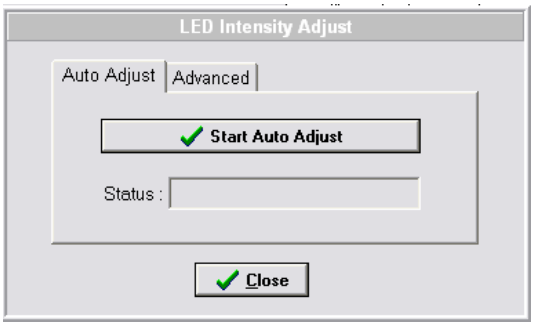

Fig. 50 LED Intensity Adjust – Auto Adjust tab

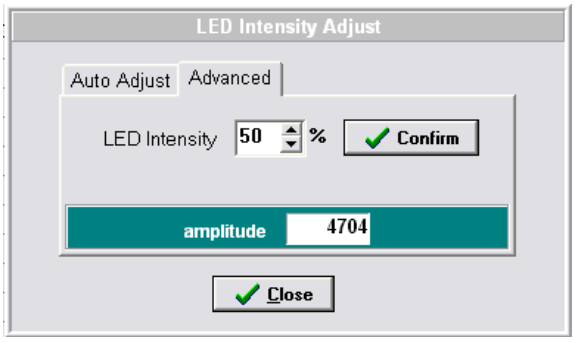

Fig. 51 LED Intensity Adjust – Advanced tab

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4.9 Software Menu Structure

Main	Submenu 1	Submenu 2
File	**→ Exit** closes the program.	
Charts displays or hides the respective measurement graphs.	**→ Oxygen** **→ Phase** **→ Amplitude** **→ Temperature**	
Display	**→ Zoom**	**→ AutoScaleY** automatically scales the y-axis. **→ Undo Zoom** restores the original display.
	→ Clear Charts clears the graphs on the display **→ Dimensions** opens a dialog to choose the dimensions for the charts.	
Print	**→ Charts** prints the charts shown on the display.	
Settings	**→ COM port** allows choosing the serial COM port for the serial interface. **→ Instrument Info** opens the INFO tap in the graphical display. **→ Analog Ouput** opens a dialog to configure the analog out of the device. **→ LED Intensity** allows adjusting the illumination level of the sensor.	

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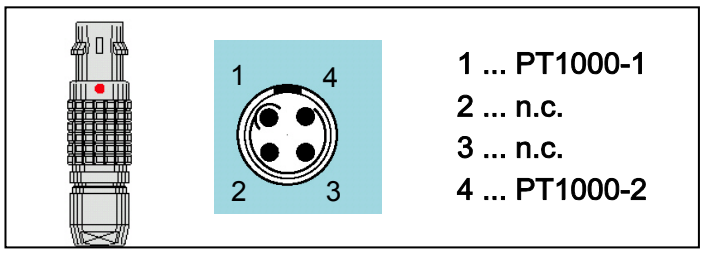
5 Technical Data

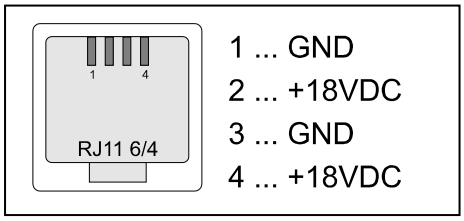
5.1 Specifications

OPTICAL SENSOR	
Oxygen sensor	PSt1
Optical connector	ST compatible, Core / Center 100 / 140
Channels	1
LED peak wavelength	505 nm

TEMPERATURE SENSOR		
Potentiometric temperature sensor (PT 1000)	Range	0 – 50 °C
	Resolution	± 0.1 °C
Temperature sensor plug	Plug type	Lemo FGG.00.304.CLAD35



DC INPUT	
	DC-Supply: 18 V / 0.83 A / type TR15RA180 Use the provided parts only.



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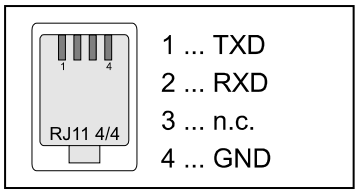
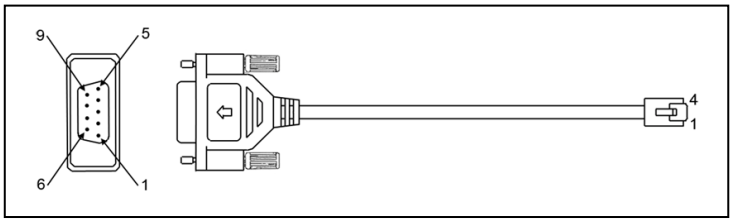
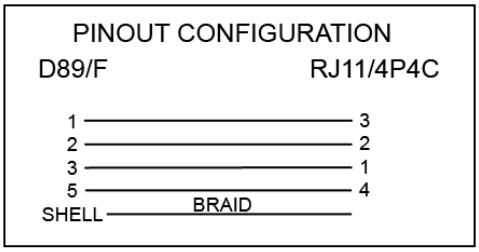
DIGITAL INTERFACE

Serial communication	a) RS232 serial interface 38400 Baud (Databits 8, Stoppbits 1, Parity none, Handshake none) b) USB interface
Transmitter port	RJ11 4/4 socket 
Serial interface cable to PC	RJ11 4/4 to DSub9  
USB interface cable to PC	RJ11 4/4 to USB type A (transmitter adapted cable)

ENVIRONMENTAL CONDITIONS

Operating temperature	0 °C to 50 ºC
Storage temperature	- 10 °C to 60 ºC
Relative humidity	0% to 80 % (non-condensing)

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OPERATION CONTROL		
LED at the front panel	Red Green Orange	Device off Device on Standby

DIMENSIONS / WEIGHT	
	185 mm x 110 mm x 45 mm
	630 g

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5.2 Analog Output and External Trigger

The Microx TX3 is supplied with a dual programmable 12 bit analog output with galvanic isolation and an external trigger input.

Analog Output	
Channels	Dual voltage outputs
Output range	0 – 4095 mV
Socket type	BNC connectors
Resolution	12 bit
Accuracy error	± 10 mV
Galvanic isolation	500 V rms
Shortcut protection	Yes
Output parameters (PC software allows to choose the parameter.)	O_2 Temperature Phase Amplitude

0 – 4095 V Voltage Output:

Voltage	0	1000 (e. g.)	4095	V
Oxygen	0	100	409.5	% air sat.
Ampl.	0	20000	81900	r.U.
Phase	0	25	102.375	°
Temperatur	0	100	409.5	°C

Examples

Formula – Oxygen:	Oxygen [% air sat.] = Voltage [V] x 409.5 / 4.095 (e. g. 0.750 V = 75 % air sat.)
Formula – Amplitude:	Ampl [r.U.] = Voltage [V] x 81.900 / 4.095 (e. g. 2.500 V = 50000 r.U.)
Formula – Phase:	Phase [°] = Voltage [V] x 102.375 / 4.095 (e. g. 2.500 V = 62.50 °)
Formula – Temperature:	Temperature [°C] = Voltage [V] x 409.5 / 4.095 (e. g. 0.500 V = 50 °C)
Update rate	Dependent on the sampling rate of the software. If an external trigger is used, the update rate is equivalent to the trigger pulse rate (min. 3 sec.).

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EXTERNAL TRIGGER INPUT		
Channels	Single input	
Socket type	BNC connectors	
Input voltage range	TTL-compatible, up to 24 V	
Trigger mode	Low-High-Low (Input must be kept Low for at least 50 µs)	
Normal state	No current	
Galvanic isolation	500 V rms	
Timing Specifications	Min. rise & fall time for trigger Max. rise & fall time for trigger Min. pulse length Min. pause length Min. periode length (TTL-compatible)	15 ns 2 ms 3 ms 10 ms 13 ms

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6 Operational Notes

6.1 Optical Output

The ST connector is a high precision optical component. Please keep it clean and dry. Always use the rubber cap to close the output when not in use.

6.2 Temperature Compensation

Use only the temperature sensor supplied. The use of any other temperature sensor may damage the device.

6.3 Warm-Up Time

The warm-up time of the electronic and opto-electronic components of the Microx TX3 is 5 minutes. After 5 min. stable measuring values will be obtained.

6.4 Power Adapter

Microx TX3 always has to be used with the original power adapter (100 - 240 VAC; 47 - 63 Hz; 18 V / 0.83 A; type TR15RA180) which is supplied.

As an alternative power source a battery can be used that meets the DC input voltage given in chapter 5 “Technical Data”. The battery adapter cable is available as an additional accessory.

6.5 Analog Outputs

WARNING: The analog outputs are not protected against any input voltage. Any voltage applied to the analog outputs can cause irreversible damage to the transmitter.

6.6 RS232 Interface / USB Interface

The transmitter uses a special interface cable. A different cable can cause malfunction. Use the provided parts only.

6.7 Maintenance

The transmitter is maintenance-free.
The housing should be cleaned with a cloth only. Avoid any moisture entering the housing. Never use benzine, acetone, alcohol or any other organic solvents.
The ST fiber connector of the sensor can be cleaned only with lint-free cloth or a cleaning implement for ST connectors.

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6.8 Service

Alignment, rework or repair work may only be carried out by the manufacturer:

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www.PreSens.de

Please contact our service team in case of any question. We look forward to helping you and are open for any proposition or criticism.

7 CE and FCC Conformity

CE Conformity

The equipment is confirmed to comply with the requirements set out in the Council Directive relating to Electromagnetic Compatibility (2004/108/EEC) and for Low Voltage (2006/95/EEC). For the evaluation of above mentioned Council Directives following standards were consulted:
DIN EN 61326-1: 2006-10
DIN EN 61010-1: 2002-08

Verification of FCC Rules

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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8 Concluding Remarks

Dear Customer,

With this manual, we hope to provide you with an introduction to work with the Microx TX3 fiber optic oxygen transmitter.

This manual does not claim to be complete. We are endeavored to improve and supplement this version.

We are looking forward to your critical review and to any suggestions you may have.

You can find the latest version at www.PreSens.de.

With best regards,

Your PreSens Team

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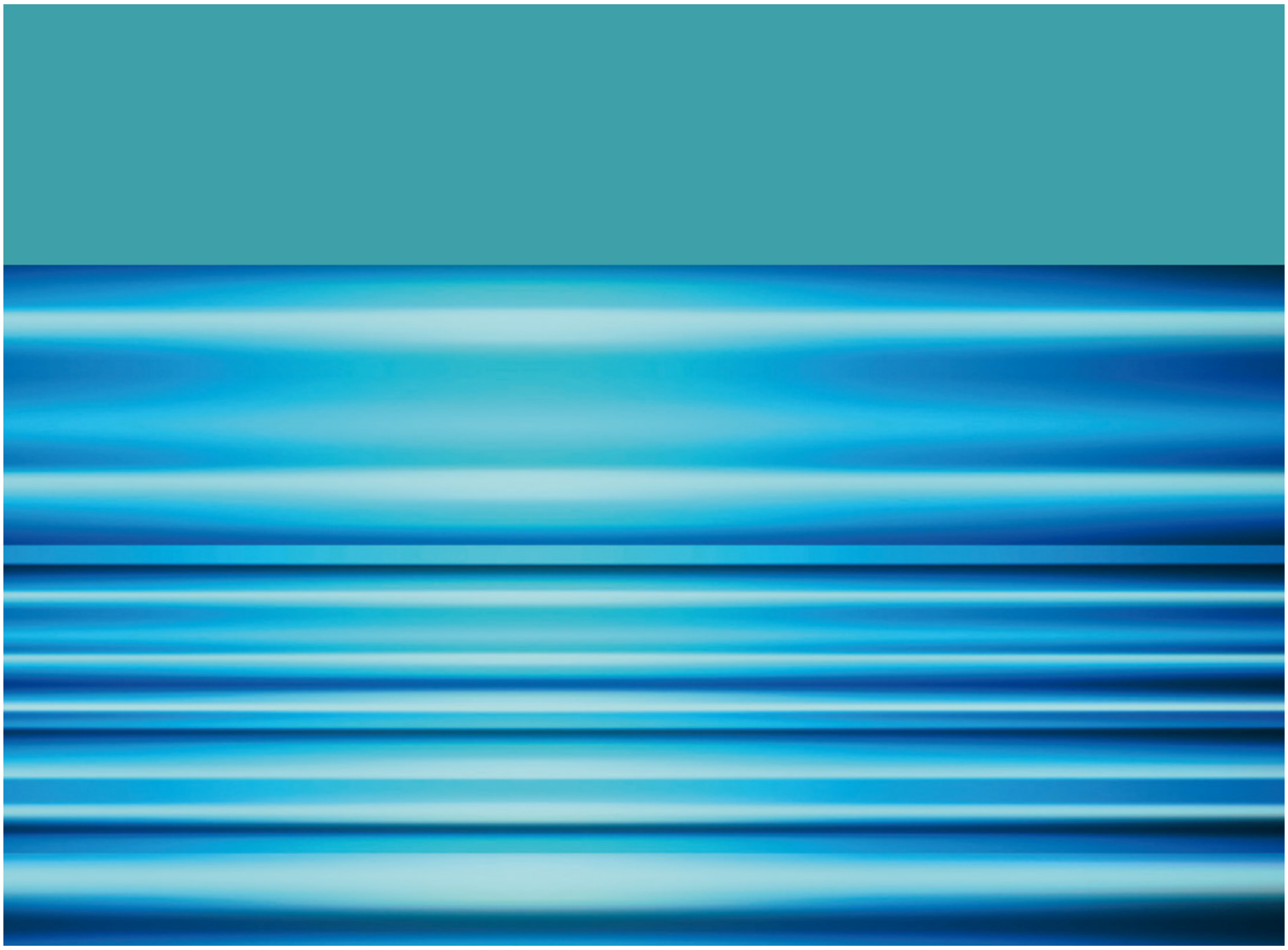

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